

Williams®

16P-3003-101  
Game No. 3003  
November, 1981



## DRAWING SET (Upright)



FOR SERVICE...  
NOTE NEW TOLL-FREE  
TELEPHONE NUMBERS:

800-621-1253  
IN ILLINOIS CALL:  
800-572-1324

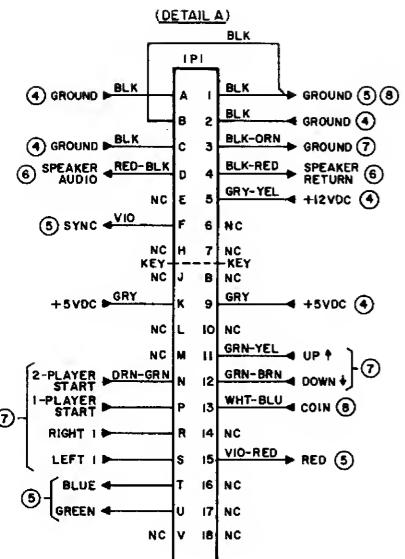
Williams®   
ELECTRONICS, INC.

3401 N. California Ave., Chicago, IL 60618  
Cable Address: WILCOIN, CHICAGO  
(312) 267-2240

## CONTENTS

Interboard Wiring Diagram. . . . .	3
R8948 CPU Board Assembly Drawing . . . . .	4
CPU Board Logic Diagram (Sheet 1 of 3) . . . . .	5
CPU Board Logic Diagram (Sheet 2 of 3) . . . . .	6
CPU Board Logic Diagram (Sheet 3 of 3) . . . . .	7
Power Supply Board Assembly Drawing . . . . .	8
Power Supply Board Schematic Diagram and Overvoltage Protection Board . . . . .	9
Power Panel Assembly Drawing . . . . .	10
Power Wiring Diagram . . . . .	11
Cabinet Wiring Diagram . . . . .	12

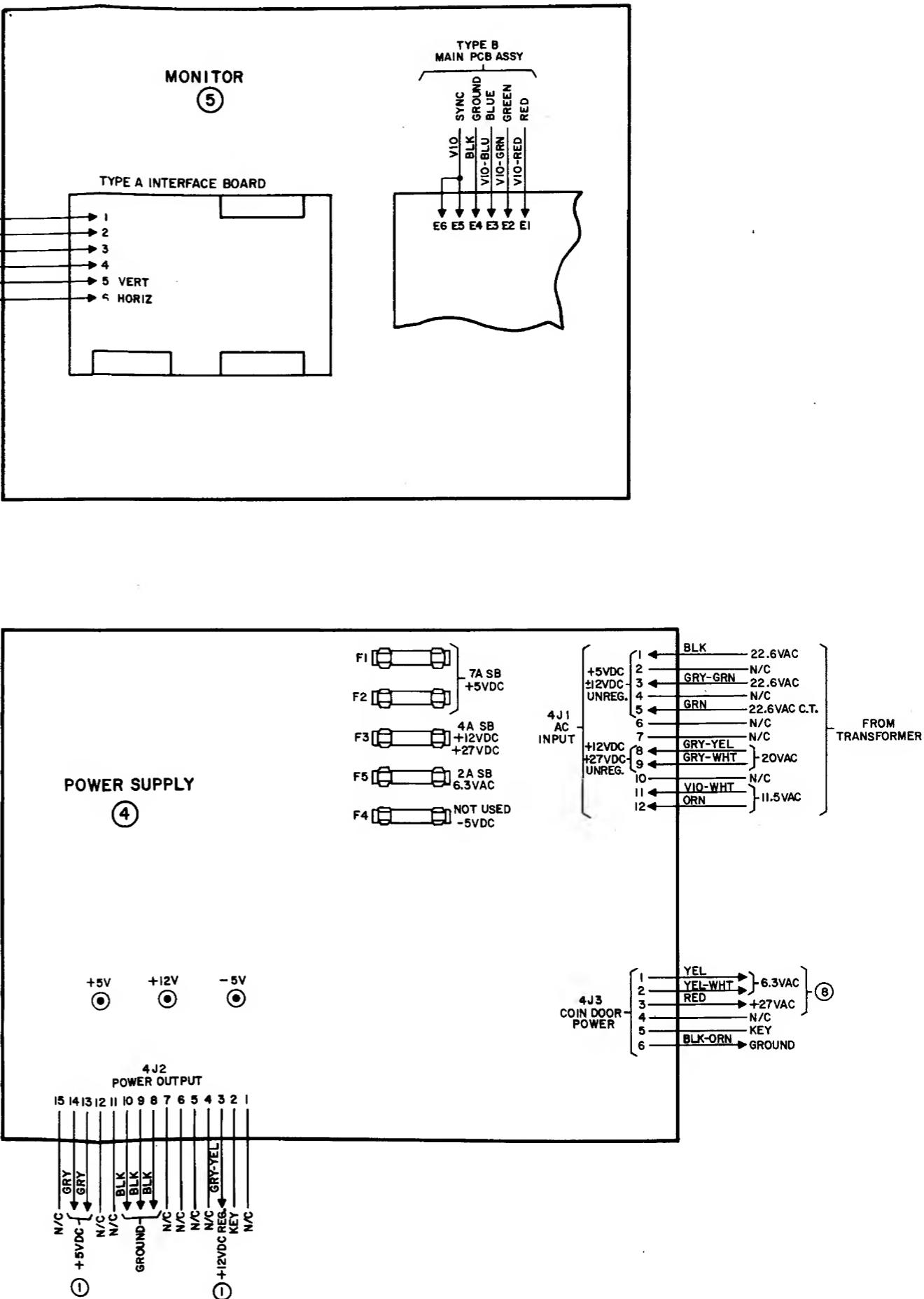
- (1) CPU BOARD
- (2)
- (3)
- (4)
- (5) MONITOR
- (6) CABINET
- (7) PLAYER PANEL
- (8) COIN DOOR



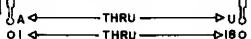
**(DETAIL B)**  
SWITCH NUMBER

ADJUSTMENT	1	2	3	4	5	6	7	**8
*RECOMMENDED	OFF	ON	ON	ON	ON	OFF	ON	OFF
1 PLAY/2 COINS	OFF	OFF						
2 PLAYS/1 COIN	ON	OFF						
*1 PLAY/1 COIN	OFF	ON						
FREE PLAY	ON	ON						
6 BRUSHES			OFF	OFF				
5 BRUSHES			ON	OFF				
4 BRUSHES			OFF	ON				
*3 BRUSHES			ON	ON				
FIRST PATTERN EASY					OFF			
*FIRST PATTERN DIFFICULT					ON			
*WARP HOLE DISABLED						OFF		
WARP HOLE ENABLED						ON		
TABLE GAME							OFF	
UPRIGHT						ON		

\*\* SET SWITCH 8 TO ON TO FREEZE PATTERN  
FOR MONITOR ADJUSTMENTS.



IJ1  
(DETAIL A)



4R 4000  
(D4-D7)  
SCRATCH RAM

4P 4400  
(D4-D7)  
COLOR RAM

4N 4000  
(D4-D7)  
CHARACTER  
RAM

6P  
SPECIAL

1M  
SOUND  
WAVEFORM  
ROM

3M  
SOUND  
TIMING ROM

4M 4000  
(D0-D3)  
SCRATCH RAM

① CPU BOARD

4L 4400  
(D0-D3)  
COLOR RAM

4K 4000  
(D0-D3)  
CHARACTER  
RAM

6J  
ROM 4

6H  
ROM 3

6F  
ROM 2

7F  
COLOR ROM

5F  
ROM B  
CHARACTERS

5E  
ROM A  
MAZE

6E  
ROM I

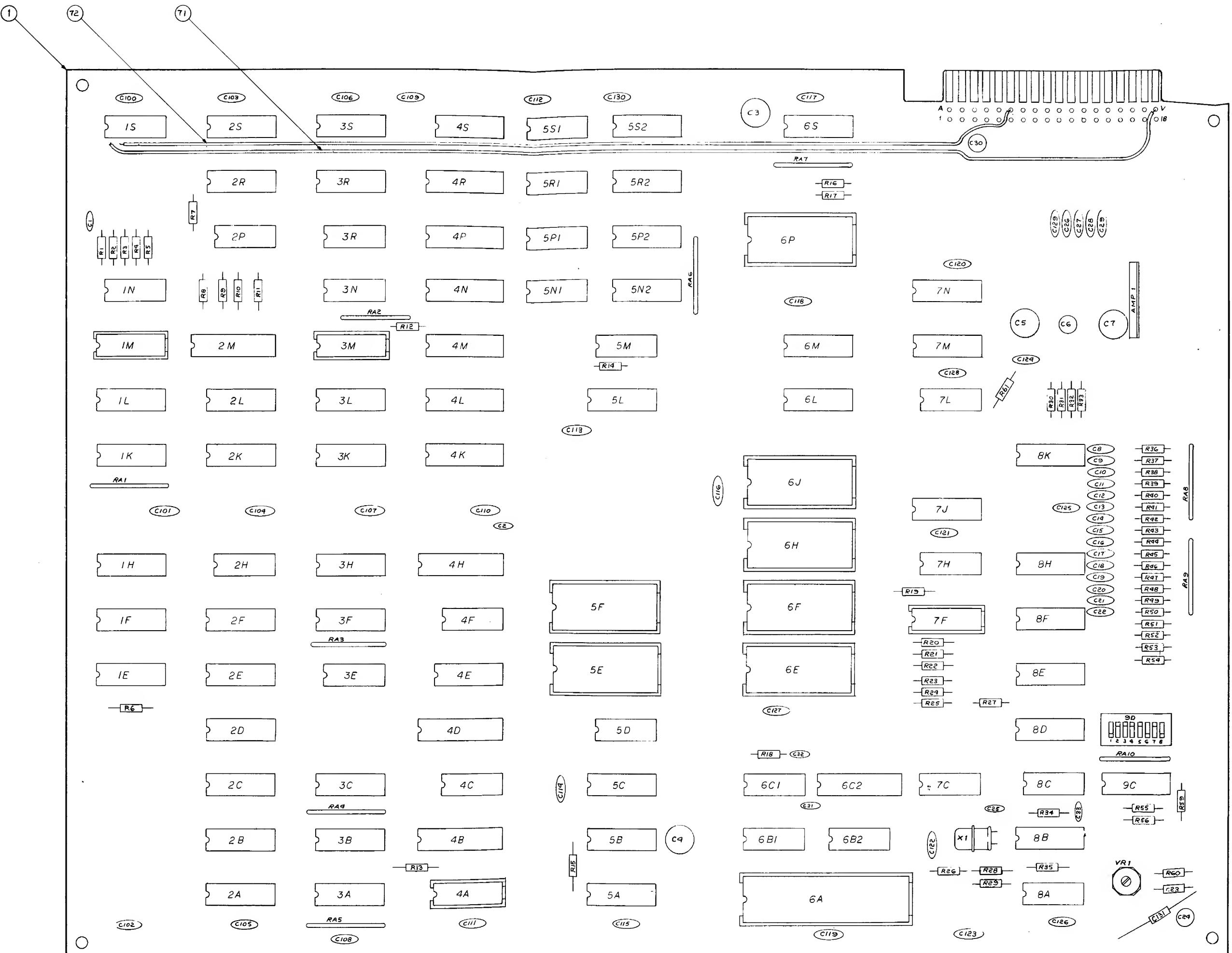
9D SWITCH  
ADJUST [00000000]  
(DETAIL B)

4A  
VIDEO ROM

6A  
Z-80 MPU

VOLUME  
CONTROL



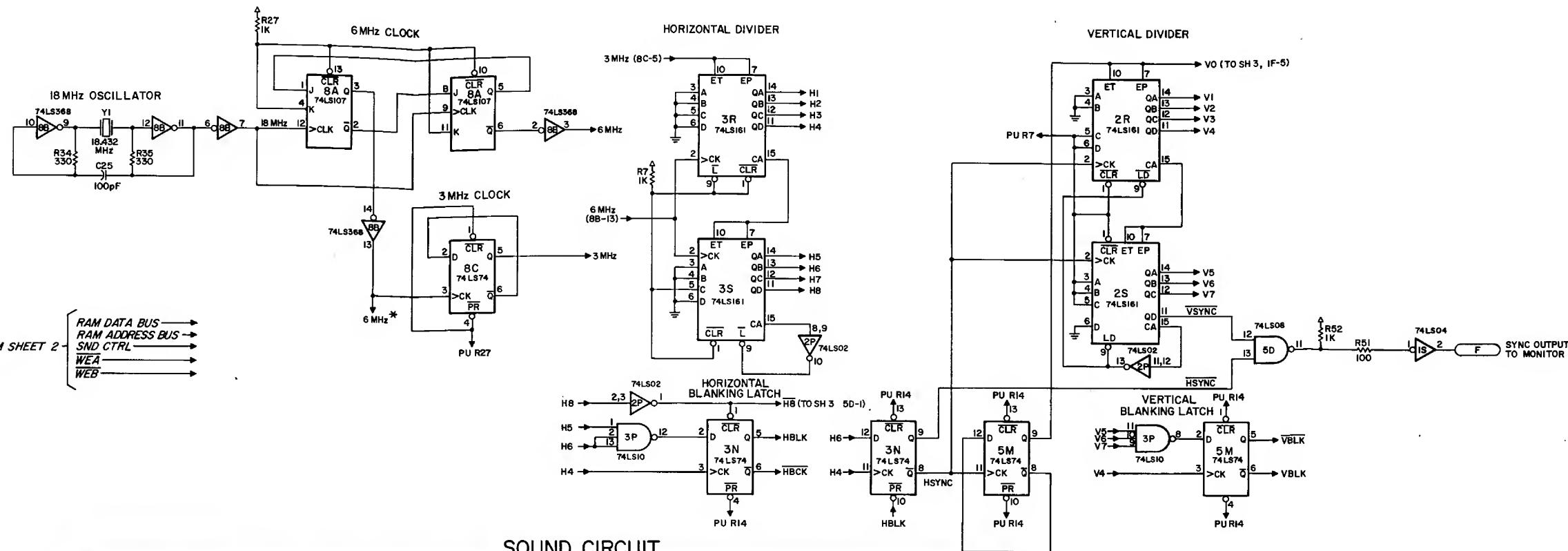


# BILL OF MATERIAL

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
1	5770-09754-00		BARE P.C. BOARD	1
2	5010-08774-00	R1, R2, 60	RESISTOR 2EK 1/4W 5%	3
3	5010-08998-00	R9	RESISTOR 2.2K 1/4W 5%	1
4	5010-09001-00	R34, R35	RESISTOR 330 1/4W 5%	2
5	5010-09034-00	R3	RESISTOR 10K 1/4W 5%	1
6	5010-09035-00	R9, R8	RESISTOR 47K 1/4W 5%	2
7	5010-09036-00	R51	RESISTOR 100 1/4W 5%	1
8	5010-09160-	R22, 25, 28, 36-50, 54	RESISTOR 220 1/4W 5%	19
9	5010-09162-00	R5	RESISTOR 100K 1/4W 5%	1
10	5010-09358-00	R6, 7, 10, 12-20, 24, 25, 26, 28, 30, 33, 35, 36, 38	RESISTOR 1K 1/4W 5%	24
11	5010-09416-00	R11, R21, R53	RESISTOR 470 1/4W 5%	3
12	5010-09768-00	R23	RESISTOR 180 1/4W 5%	1
13	5014-09755-00	VRI	VARIABLE RESISTOR 1K 1/4W	1
14	5019-09748-00	R41, RA3, RA4, RA6-RA10	S.I.P. 1K 8R, 9, 5%	8
15	5040-09776-00	C3, C4, C5, C7	CAPACITOR +50-10 470 MFD 16V RADIAL	4
16	5040-09777-00	C30	CAPACITOR +50-10 10 MFD 16V RADIAL	1
17	5043-08980-00	C1	CAPACITOR .01 MFD 10V +80-20	1
18	5043-09773-00	C8-C22, C26-C29, C100-C130	CAPACITOR .1 MFD 18V +80-20	50
19	5043-08942-00	C31, C32, C33, C25	CAPACITOR 100 PFD 50V ±10	4
20	5043-09775-00	C2	CAPACITOR 330 PFD 18V +80-20	1
21	5280-09530-00	3E	IC7420, DUAL 9 IN NAND	1
22	5280-09547-00	7C	IC7427 3 IN NOR	1
23	5280-09625-00	2K, 2L, 3F, 3H	IC7489 16 X 4 RAM	4
24	5281-09215-00	GB1, IS	IC741504 HEX INV	2
25	5281-09235-00	3P	IC74LS10 3 IN NAND	1
26	5281-09246-00	4S, 5L, 7M	IC74LS139 2-4 DECODER	3
27	5281-09247-00	2P, 5N1, 7L	IC74LS02 2 IN NOR	3
28	5281-09308-00	4H, 6C2	IC74LS295 OCTAL TRANSCIEVER	2
29	5281-09385-00	6S, 8D, 6E, 6F, 8H, 8P1, 8L, 6M	IC74LS367 HEX BUFFER	8
30	5281-09480-00	8A	IC74LS107 DUAL	1
31	5281-09484-00	TN	IC74LS542 BCD-DECODER	1
32	5281-09485-00	5S1, 5P2, 5S2	IC74LS557 QUAD 2-1 MULTX	3
33	5281-09487-70	3N, 5M, 6C1, 7C	IC74LS74 DUAL	4
34	5281-09493-00	4C, GB2	IC74LS500 QUAD 2 IN NAND	2
35	5281-09733-00	1L, 1H	IC74LS174 HEX F/F	2
36	5281-09734-00	1K, 1F, 2F	IC74LS283 ADDR 4B	3
37	5281-09735-00	1E, 2S, 2R, 2E, 3R, 3S, 9C	IC74LS161 BIN CTR	7
38	5281-09736-00	2M, 4D	IC74LS273 OCTAL F/F	2
39	5281-09737-	2H, 4F	IC74LS86 QUAD OR	2
40	5281-09738-00	3B, 3L, 4E, 5A	IC74LS157 MLTPX	4
41	5281-09739-00	3A, 3K	IC74LS158 MLTPX I	2
42	5281-09740-00	3C	IC74LS375 LATCH	1
43	5281-09741-00	4B	IC74LS377 QUAD F/F	1
44	5281-09742-00	5B, 5C	IC74LS194 SHFT/R	2
45	5281-09743-00	5D, 7H	IC74LS08 QUAD 2 IN AND	2
46	5281-09744-00	5R1, 5N2, 5R2	IC74LS258 MLTPX	3
47	5281-09745-00	7J	IC74LS138 DMLTPX	1
48	5281-09746-00	8B	IC74LS363 HEX INV	1
49	5281-09747-00	8K	IC74LS259 LATCH	1

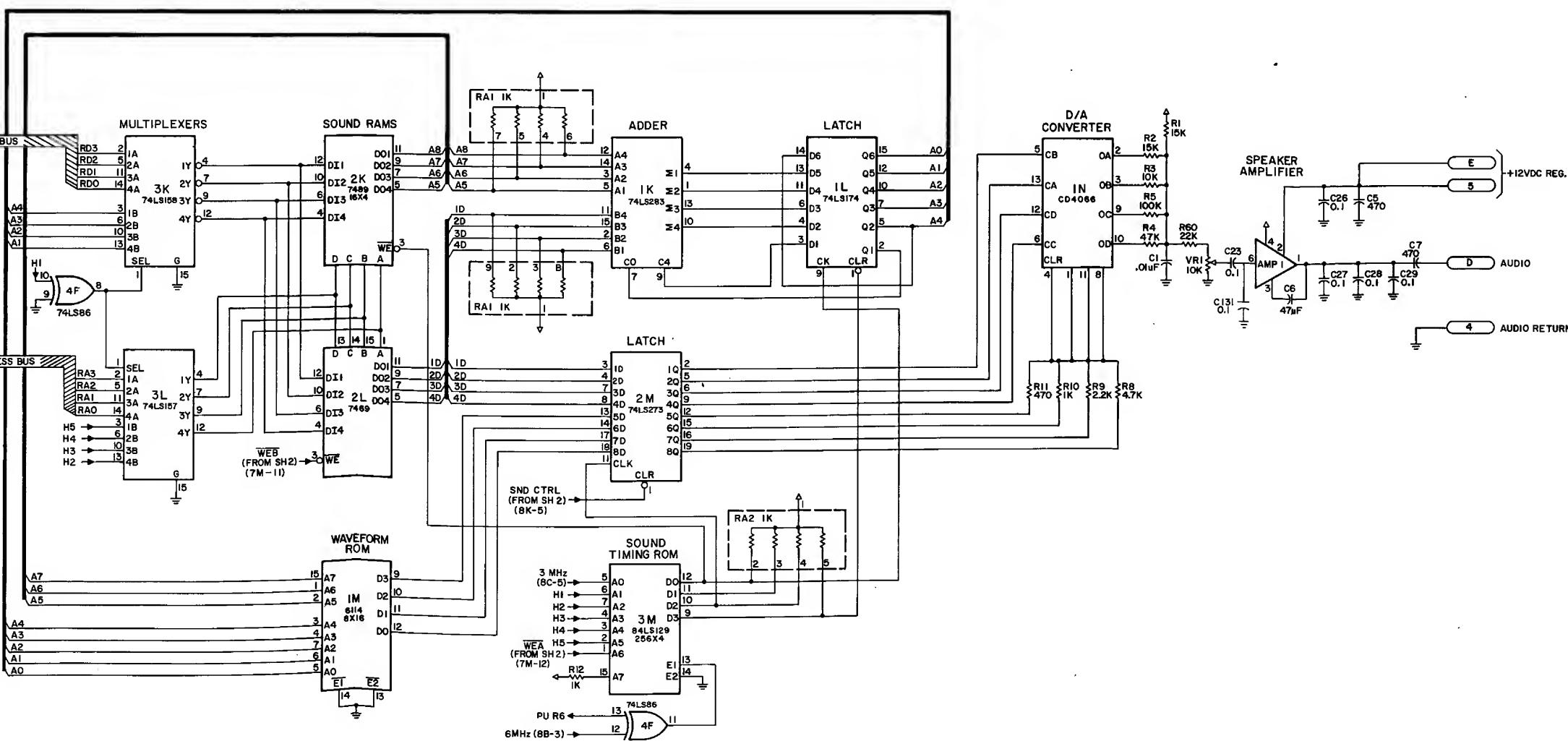
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
50	5282-09758-00	7F	ICM/TRX COLOR PROM	1
51	5282-09759-00	1M	ICM/TRX WAVE FORM GENERATOR	1
52	5282-09760-00	3M	ICM/TRX SOUND CONTROL ASM	1
53	5282-09761-00	4A	ICM/TRX VIDEO GENERATOR ASM	1
54	5310-09712-00	1N	ICD04066, 4 A/SW	1
55	5340-09751-00	2A, 2B, 2C, 2D	ICRAM/S 2125AL 1K x 1	4
56	5340-09752-00	4B, 4R, 4K, 4L, 4MAN	ICRAM/S 2114-3 1K x 4	6
57	A-5343-09762-	5E	ICM/TRX ROM A ASM	1
58	A-5343-09763-	5F	ICM/TRX ROM B ASM	1
59	A-5343-09764-	6E	ICM/TRX ROM C ASM	1
60	A-5343-09765-	6F	ICM/TRX ROM D ASM	1
61	A-5343-09766-	6H	ICM/TRX ROM E ASM	1
62	A-5343-09767-	6J	ICM/TRX ROM F ASM	1
63	5370-09750-00	AMP 1	IC3T12 AUDIO AMP	1
64	5490-09753-00	6A	I.C. MPU Z80A	1
65	5410-09771-00	6P	IC.CUSTOM	1
66	5580-09749-00	X1	1B.932 MHZ CRYSTAL	1
67	5645-09285-00	9D	8 STATION DIP SWITCH	1
68	5700-09985-00	6A	40 PIN IC SOCKET	1
69	5700-09004-00	5F, 5E, 6E, 6F, 6G, 6H, 6P	24 PIN IC SOCKET	7
70	5700-09006-00	1M, 3M, 4A, 7F	16 PIN IC SOCKET	4
71	HW-00030-9		JUMP WIRE WHITE	14"
72	HW-00030-9		JUMP WIRE WHITE	12"
73	5040-09422-00	C6, C24	CAPACITOR 47MFD 50V +50-10	2
74	5043-08996-00	C131, C23	0.1 MFD AXIAL 50V ±20	2
75	5010-08991-00	R61	4.7K R, 5%, 1/4W	1
76	5019-09780-00	RA2, RA5	S.I.P. 1K 4R, 5.5%	2

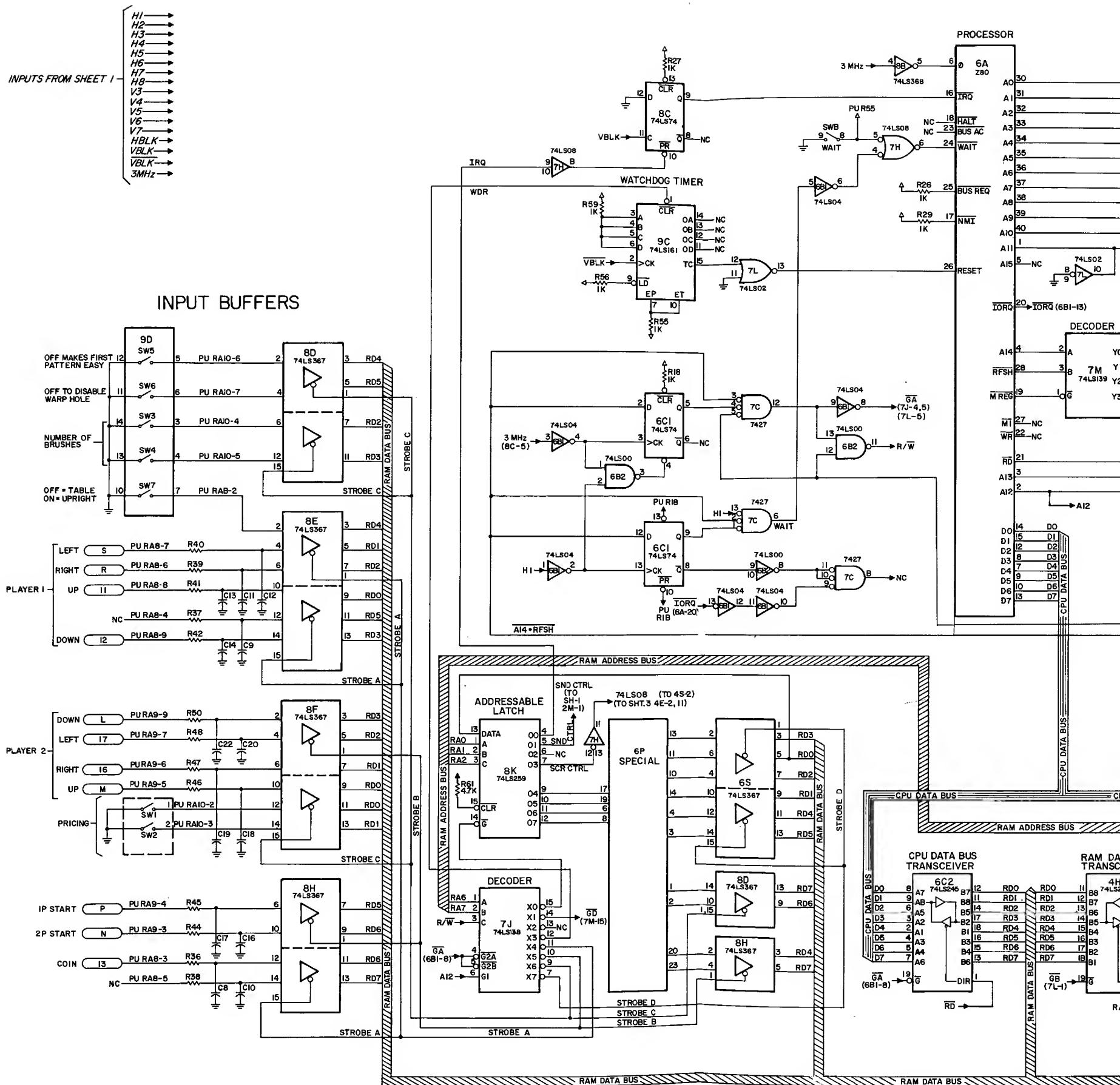
## CLOCK CIRCUIT



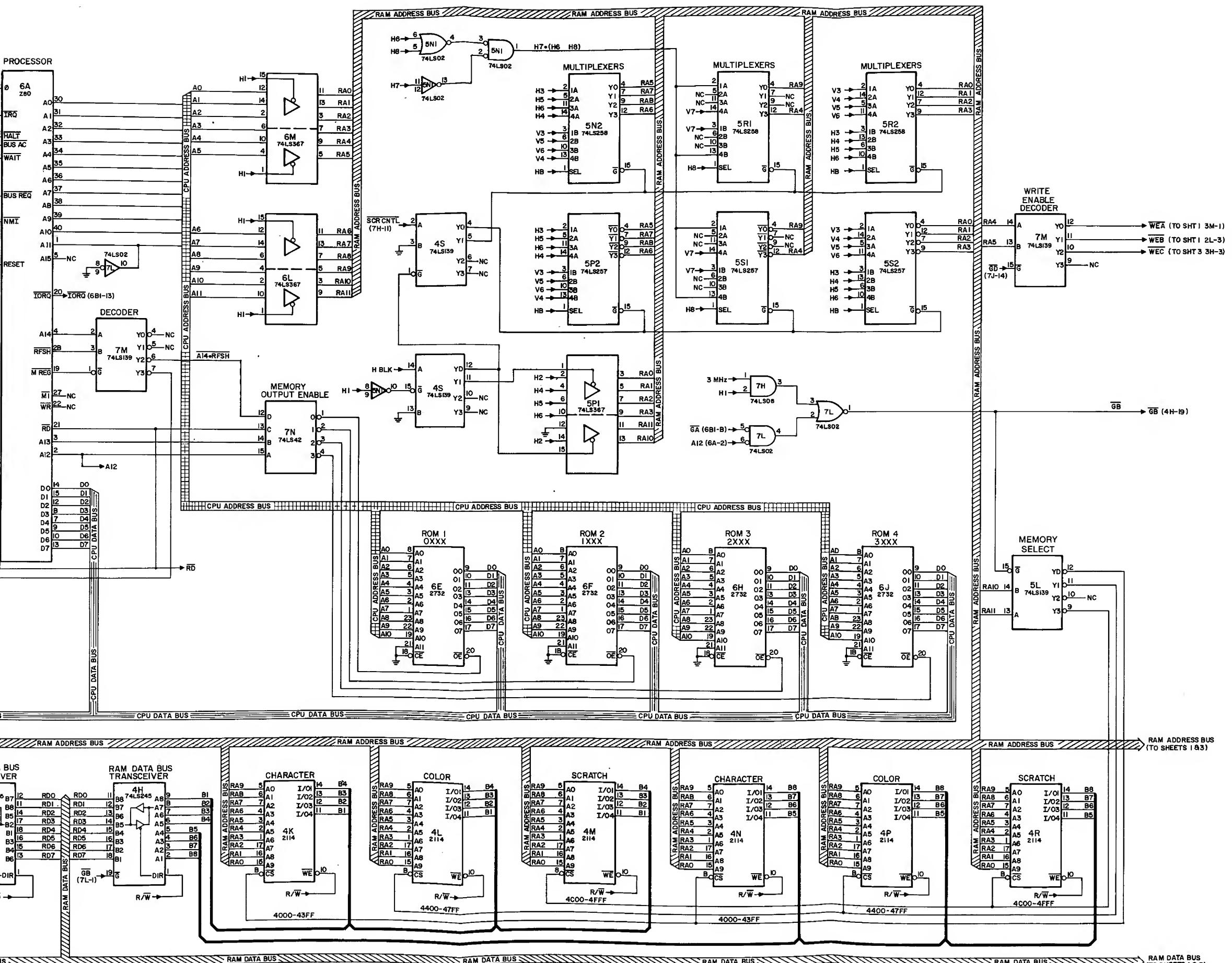
## DIVIDERS

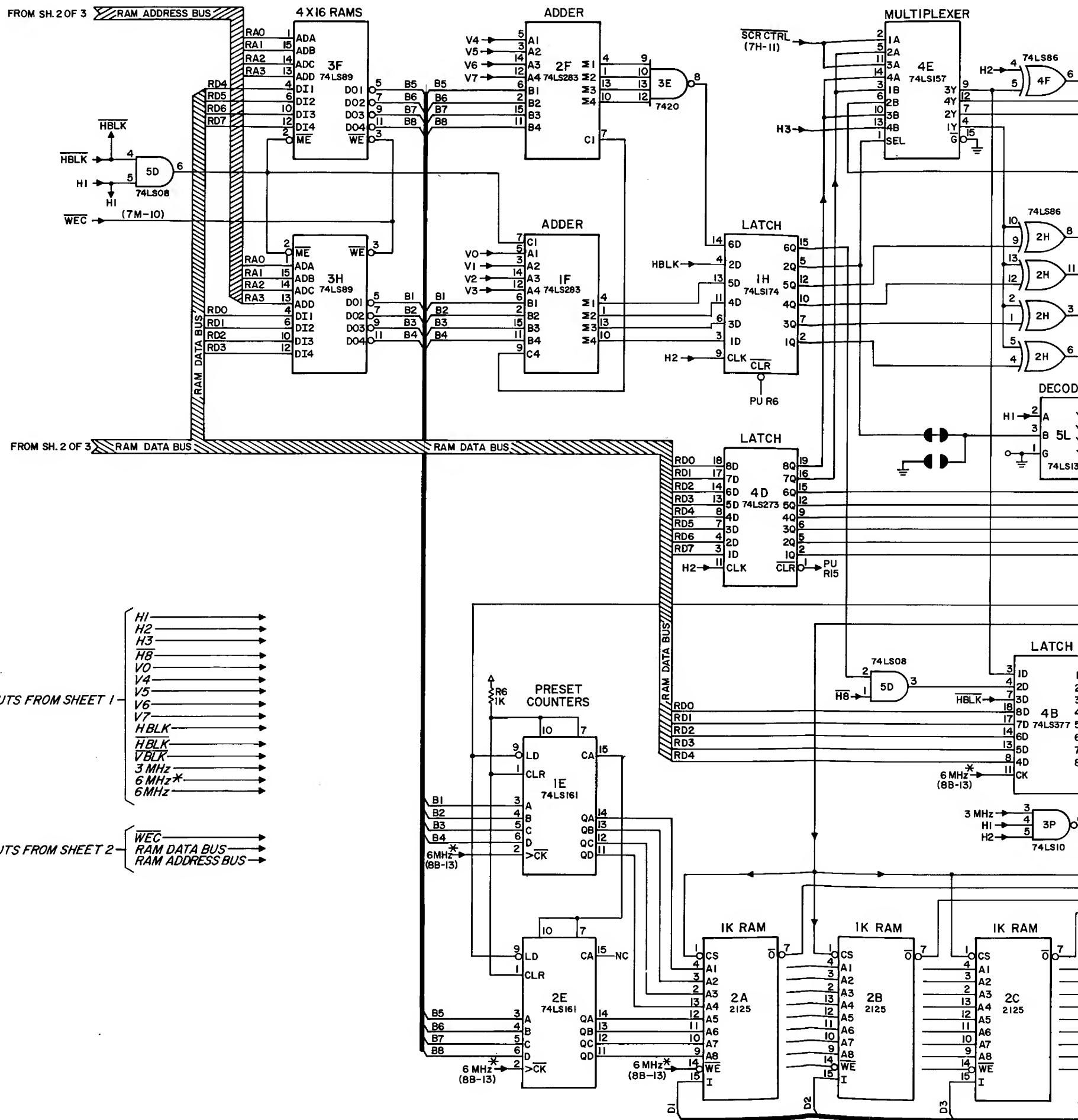
## SOUND CIRCUIT

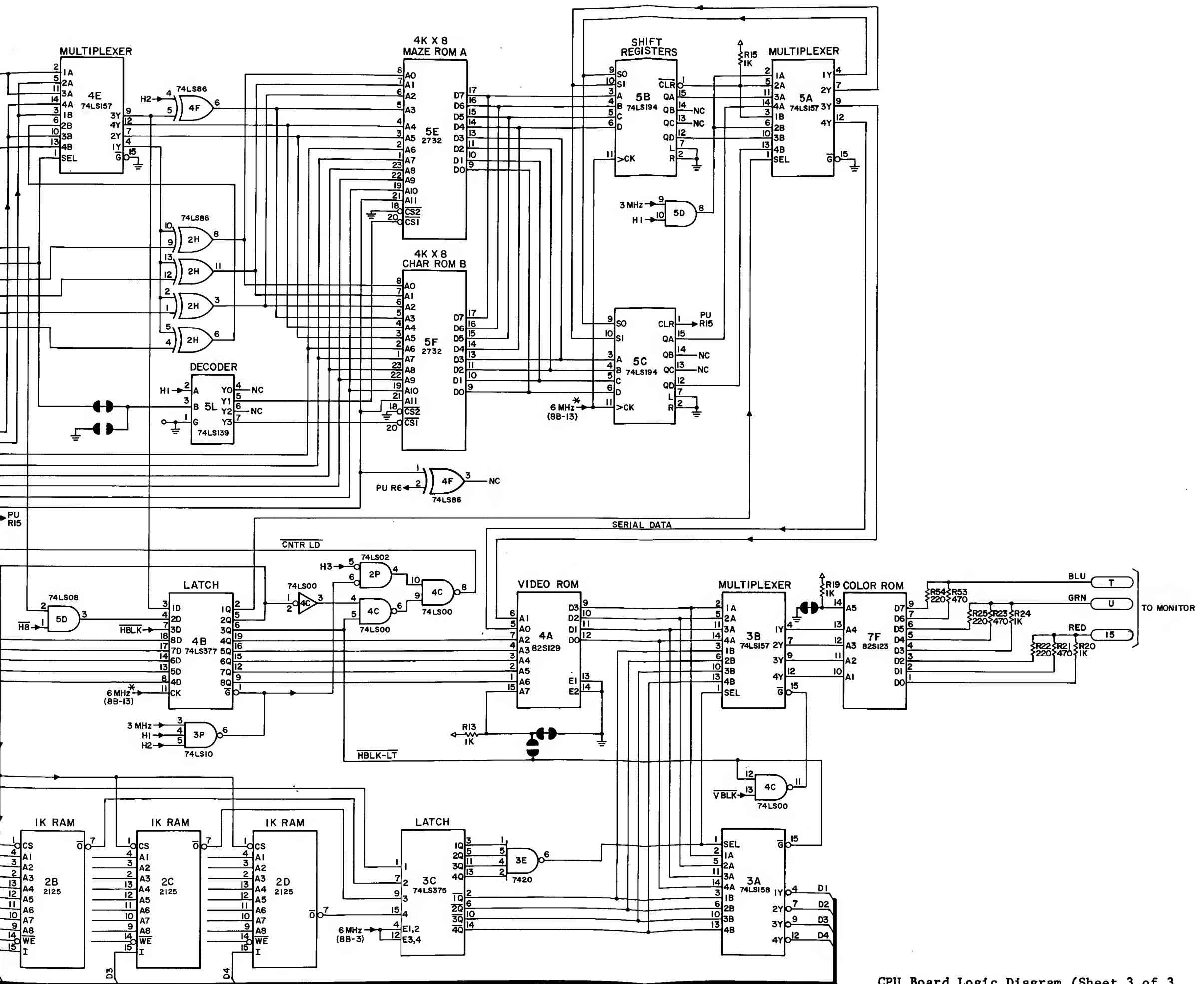




## SCREEN DECODING

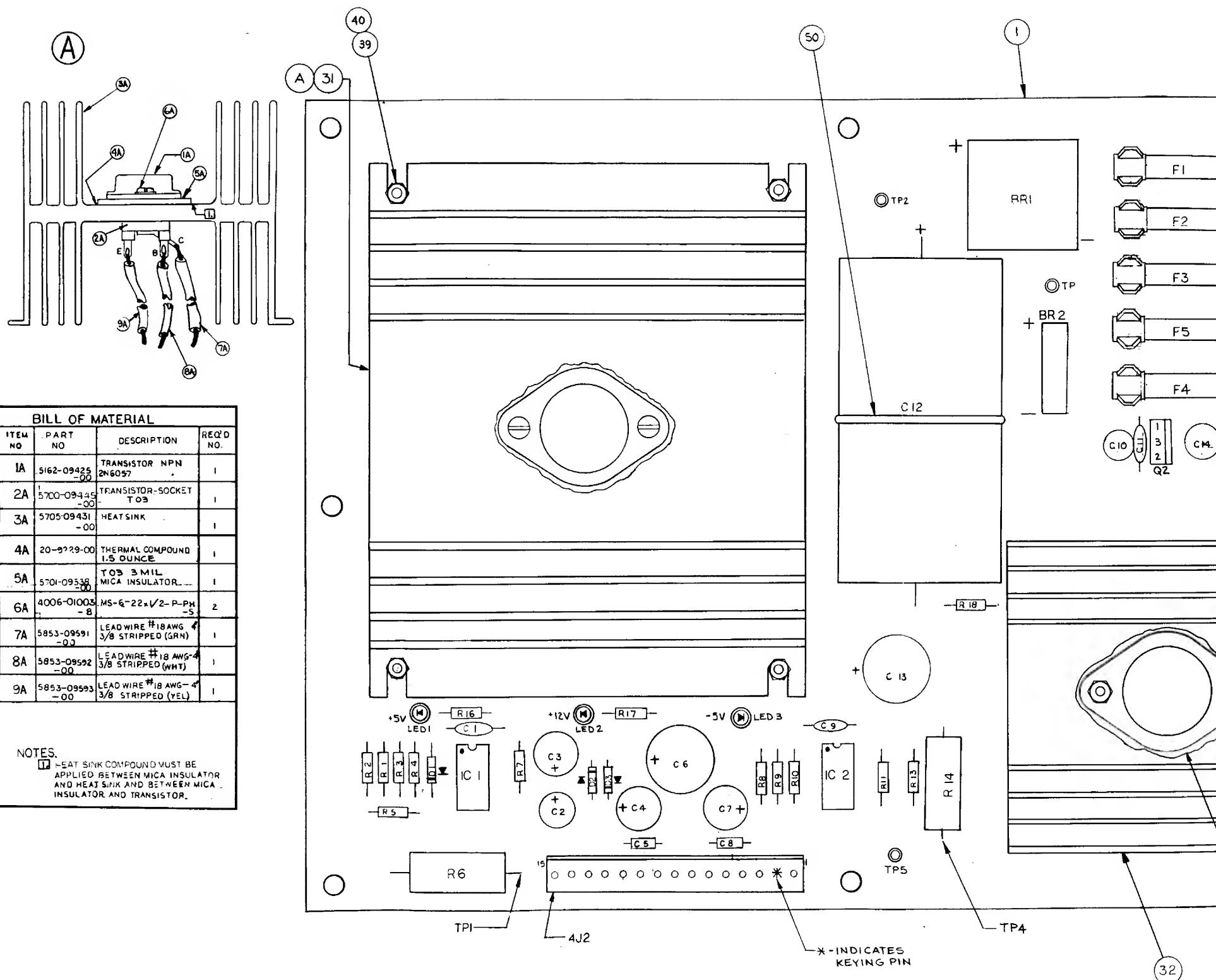


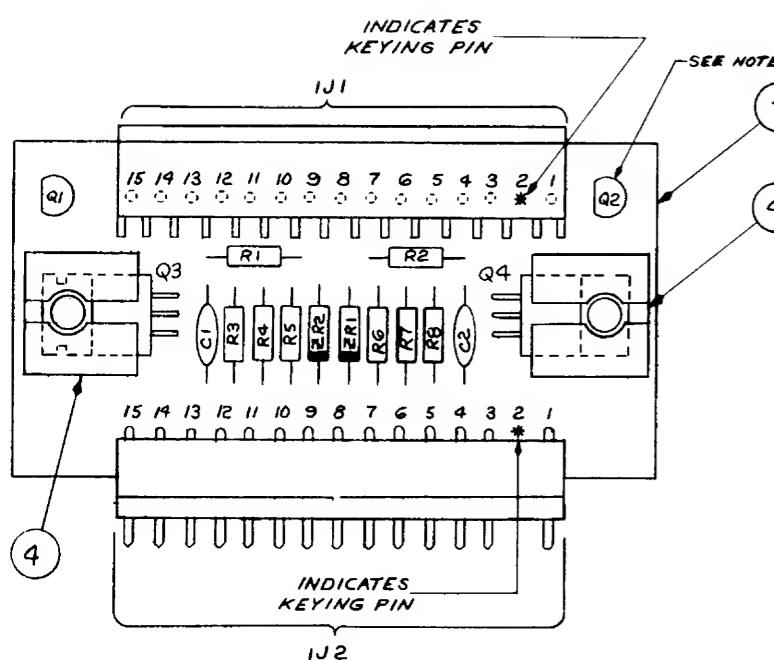
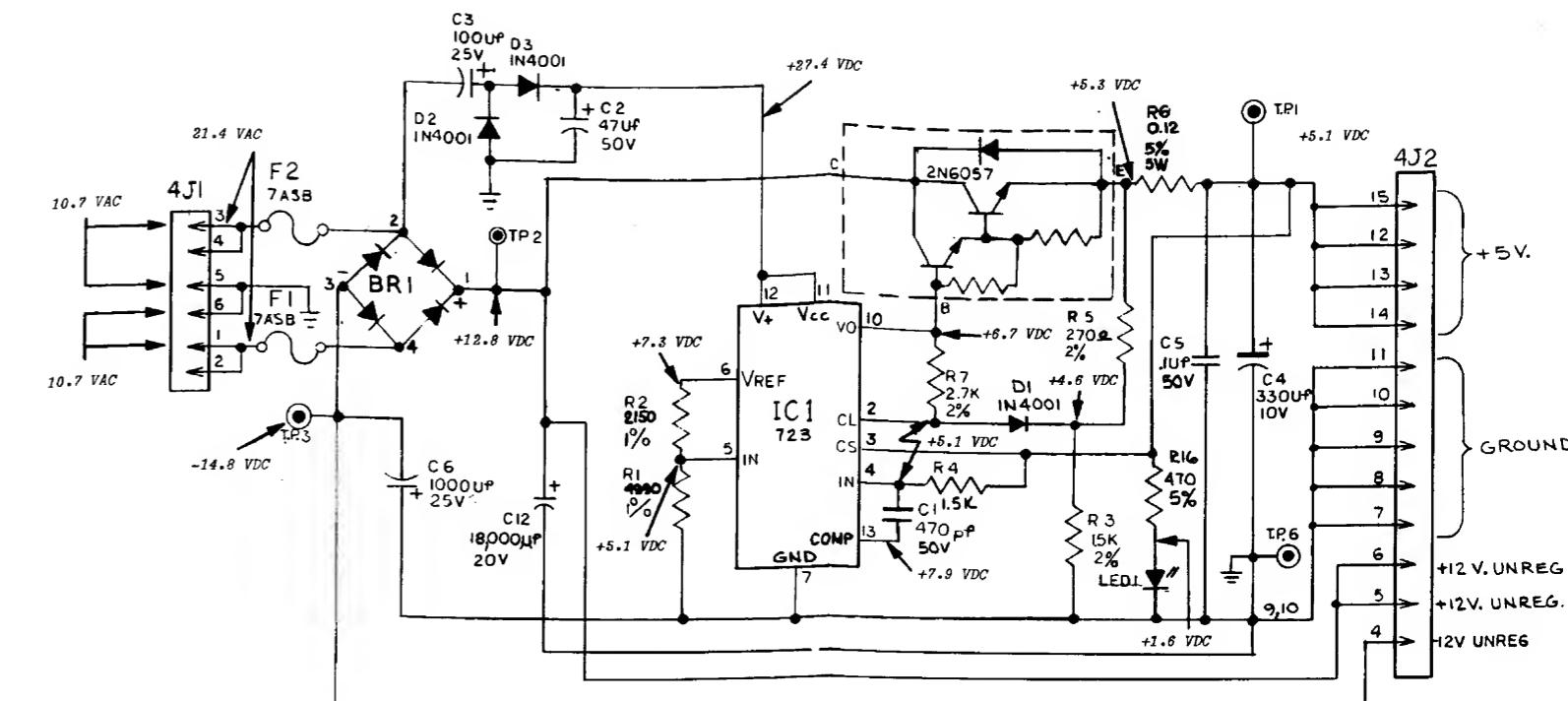
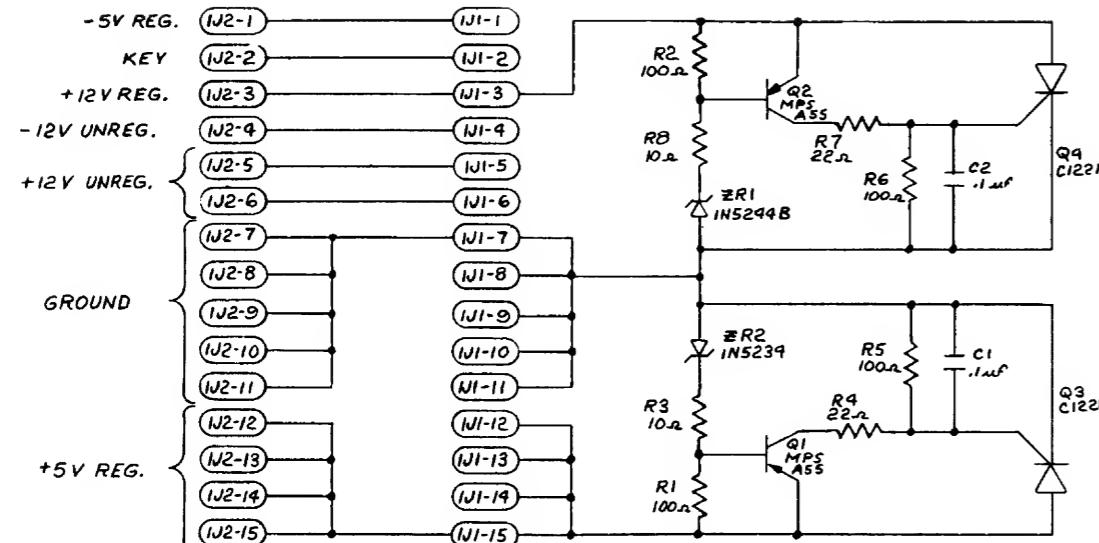




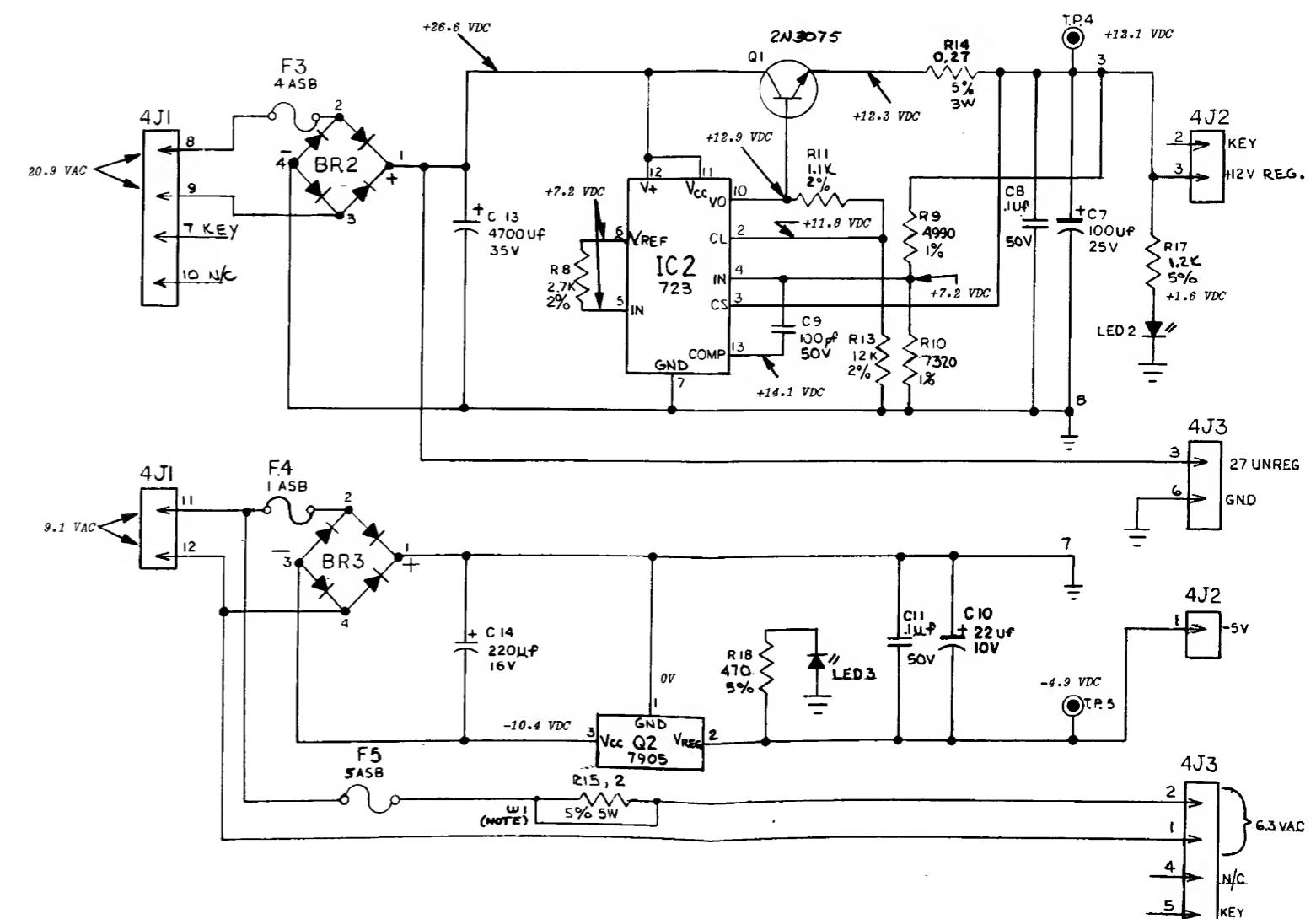
**BILL OF MATERIAL**

ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
1	5173-09474-00		P.C. BARE P.C. BOARD	
2	5010-09085-00	R4	RESISTOR, 1.5K 5%, 1/4W	1
3	5010-09541-00	R8,R7	RESISTOR, 2.7K 2%, 1/4W	2
4	5010-09508-00	R5	RESISTOR, 270 2%, 1/4W	1
5	5010-09428-00	R3	RESISTOR, 1.5K 2%, 1/4W	1
6	5010-09509-00	R11	RESISTOR, 1.1K 2%, 1/4W	1
7	5010-09510-00	R13	RESISTOR, 12K 2%, 1/4W	1
8	5013-09542-00	R10	RESISTOR, 7.32K 1%, 1/4W	1
9	5013-09427-00	R1 & R9	RESISTOR 4.99K 1%, 1/4W	2
10	5013-09426-00	R2	RESISTOR 2.15K 1%, 1/4W	1
11	5012-09429-00	R6	RESISTOR 12Ω, 5%, 5W	1
12	5012-09512-00	R14	RESISTOR, 27.5Ω, 5W +50% -10%	1
13	5040-09421-00	C3 & C7	CAPACITOR, 100MFD, 25V. RADIAL +50% -10%	2
14	5040-09422-00	C2	CAPACITOR, 47MFD, 50V. RADIAL +50% -10%	1
15	5040-09420-00	C6	CAPACITOR, 1000MFD, 25V. RADIAL +50% -10%	1
16	5040-09419-00	C12	CAPACITOR, 18,000MFD, 20V. RADIAL +50% -10%	1
17	5040-09423-00	C4	CAPACITOR, 330MFD, 10V. RADIAL +50% -10%	1
18	5040-09504-00	C13	CAPACITOR, 4700MFD, 35V. RADIAL +50% -10%	1
19	5043-09596-00	C5,C8,C11	CAPACITOR, 1MFD, 50V. AXIAL 25U +10%	3
20	5043-09065-00	C1	CAPACITOR, 470 PFD, 50V. AXIAL X7R +15%	1
21	5043-09492-00	C9	CAPACITOR, 100 PFD, 50V. AXIAL 52L +50% -10%	1
22	5040-09506-00	C14	CAPACITOR, 220MFD, 16V. RADIAL +50% -10%	1
23	5040-09493-00	C10	CAPACITOR, 22MFD, 10V. RADIAL +50% -10%	1
24	5070-06258-00	D1,D2,D3	DIODE, IN4001 +10%	3
25	5100-09418-00	BR1	BRIDGE RECTIFIER, 33 AMP 100V	1
26	5100-09513-00	BR2	DIODE BRIDGE, 4.0A, 50V	1
27	5100-09514-00	BR3	DIODE BRIDGE 1.0A, 50V.	1
28	5731-09432-00	F1,F2	FUSE, 7A 50V	2
29	5731-06314-00	F3	FUSE, 4A, 50V., 250 V.	1
30	5731-06569-00	F4	FUSE, 1A, 50V.	1
31	518416-00		HEAT SINK ASSEMBLY (SEE A)	1
32	5105-09543-00		HEAT SINK	1
33	5191-09074-00	4J2	HEADER, 15 PIN, 09-65-1151	1
34	5191-09043-00	4J1	HEADER, 12 PIN, 09-65-1121	1
35	5200-09515-00	Q2	VOLTAGE REGULATOR 7905	1
36	5460-09424-00	IC1, IC2	VOLTAGE REGULATOR 723	2
37	5824-09248-00	TP2,TP3 TP5,TP6	TERMINAL #1902-1 (TEST POST)	4
38	20-9229-00		THERMAL COMPOUND .02 OUNCE	AR
39	4005-01051-07		5-40x1/16 R.H. MECH. SCREW	6
40	4405-01112-00		5-40 HEX NUT	6
41	5161-09552-00	Q1	2N3055 TRANSISTOR NPN	1
42	5131-09651-00	F5	FUSE, 5A, 50V	1
43	5191-09038-00	4J3	HEADER, 6 PIN, 09-65-1061	1
44	5012-09544-00	R15	RESISTOR, 2.0Ω, 5%, 5W	1
45	5010-09416-00	R16, R18	RESISTOR, 47Ω, 5%, 1W	2
46	5010-09314-00	R17	RESISTOR, 1.2K, 5%, 1W	1
47	5701-09538-00		INSULATOR, MICA, 3 mil	1
48	5671-09019-00	LED1,LED2,LED3	LED, RED	1
49	03-7598		INSULATOR, NYLON	2
50	03-7520		TIE WRAP	1
51	5732-09178-00		FUSEHOLDER	10





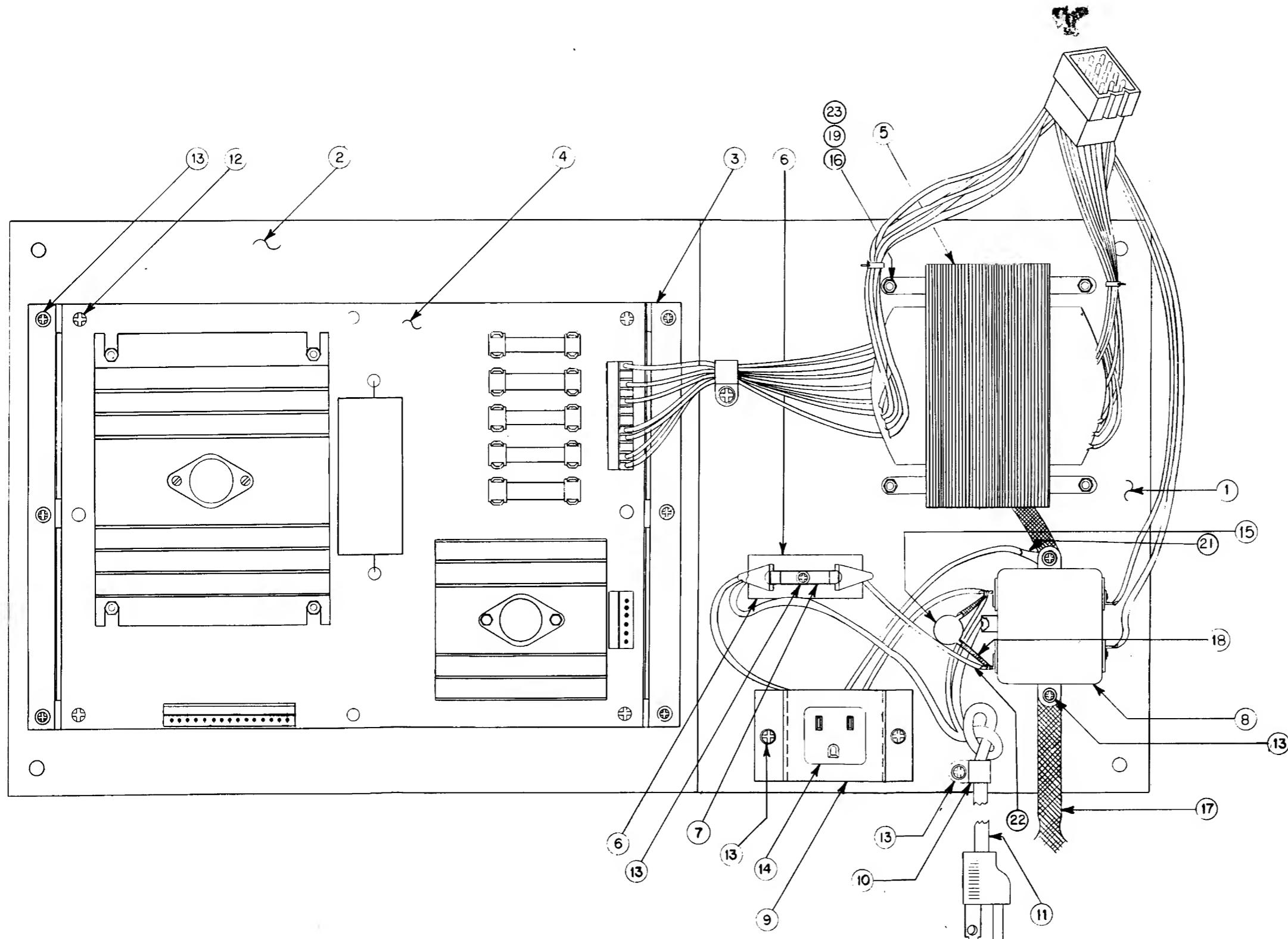
BILL OF MATERIALS				
ITEM NO.	PART NO.	PART DESIGNATION	DESCRIPTION	REQ'D NO.
1	5773-09664-00		BARE P.C. BOARD	1
2	5792-09676-00	IJ1	RIGHT ANGLE CONNECTOR, 15 PIN	1
3	5791-09670-00	IJ2	HEADER CONNECTOR, 15 PIN	1
4	5705-09663-00		HEAT SINK, AAVID 5741	2
	5705-09688-00		HEAT SINK, THERMALLOY 6093	0
7	5130-09661-00	Q3, Q4	SCR 122F (100V)	2
8	5190-09430-00	Q1, Q2	TRANSISTOR MPS A55	2
9	5075-09662-00	ZR1	ZENER IN5244 $\pm 5\%$ (14V)	1
10	5075-09406-00	ZR2	ZENER IN5239 $\pm 5\%$ (6.2V)	1
11	5010-09036-00	R1, R2, R5 & RG	RESISTOR C.F. 100 $\Omega$ $\pm 5\%$ 1/4W	4
12	5010-09039-00	R3, R8	RESISTOR C.F. 10 $\Omega$ $\pm 5\%$ 1/4W	2
13	5010-09434-00	R4, R7	RESISTOR C.F. 22 $\Omega$ $\pm 5\%$ 1/4W	2
14	5043-08996-00	C1, C2	CAPACITOR 0.1 $\mu$ F CERAMIC $+80\%-20\%50V$	2



NOTES:

1. OBSERVE POLARITY OF CAPACITORS,  
DIODES AND POSITION OF TRANSISTORS.
2. REFERENCE DWG: SCHEMATIC 16-8810

NOTE:  
W1 CONNECTED ONLY FOR COCKTAIL  
APPLICATIONS.



BILL OF MATERIALS		
ITEM	PART NO.	DESCRIPTION
1	11-580	POWER SUPPLY MTG. BD.
2	01-7001	POWER SUPPLY GND PLATE
3	01-7002	POWER SUPPLY SUPPORT BRKT.
4	D-8359	POWER SUPPLY BOARD
5	C-8529	VIDEO TRANSFORMER ASSY
6	8-6448-1	FUSE MOUNT ASS'Y.
7	5731-08633-00	LINE FUSE 3AMP 115V
8	5102-08895-00	LINE FILTER 5A
9	01-6948-1	OUTLET MTG. BRACKET
10	03-6048-6	CABLE CLAMP - 3/8
11	SEE NOTE #2	LINE CORD
12	4006-01018-04	MS. #6-32 x 1/4 P-RH
13	4108-01022-08	SMS #8-32 x 1/2 P-RWH-A
14	5851-09184-00	3 WIRE SNAP-IN OUTLET
15	SEE NOTE #1	VARISTOR
16	4408-01117-00	NUT 8-32 HEX
17	20-9223-3	6 INCH BRAIDED GROUND WIRE
18	20-9256	1 INCH SLEEVING INSULATION
19	4703-00008-00	NO. 8 EXTERNAL LOCK WASHER
20	5825-06523-00	TERMINAL LUG
21	5852-09575-00	BLACK 18 AWG JUMPER WIRE 2.5L
22	4008-01005-22	MS. 8-32 x 1 1/8 P-PH

NOTES:

1. FOR 115V.A.C., 130V. VARISTOR #5017-09044.

IS USED.

FOR 230V.A.C., A 275V VARISTOR #5017-09063

IS USED.

2. LINE CORD PART NUMBERS:

5850-06206-00 12 FT. EUROPE

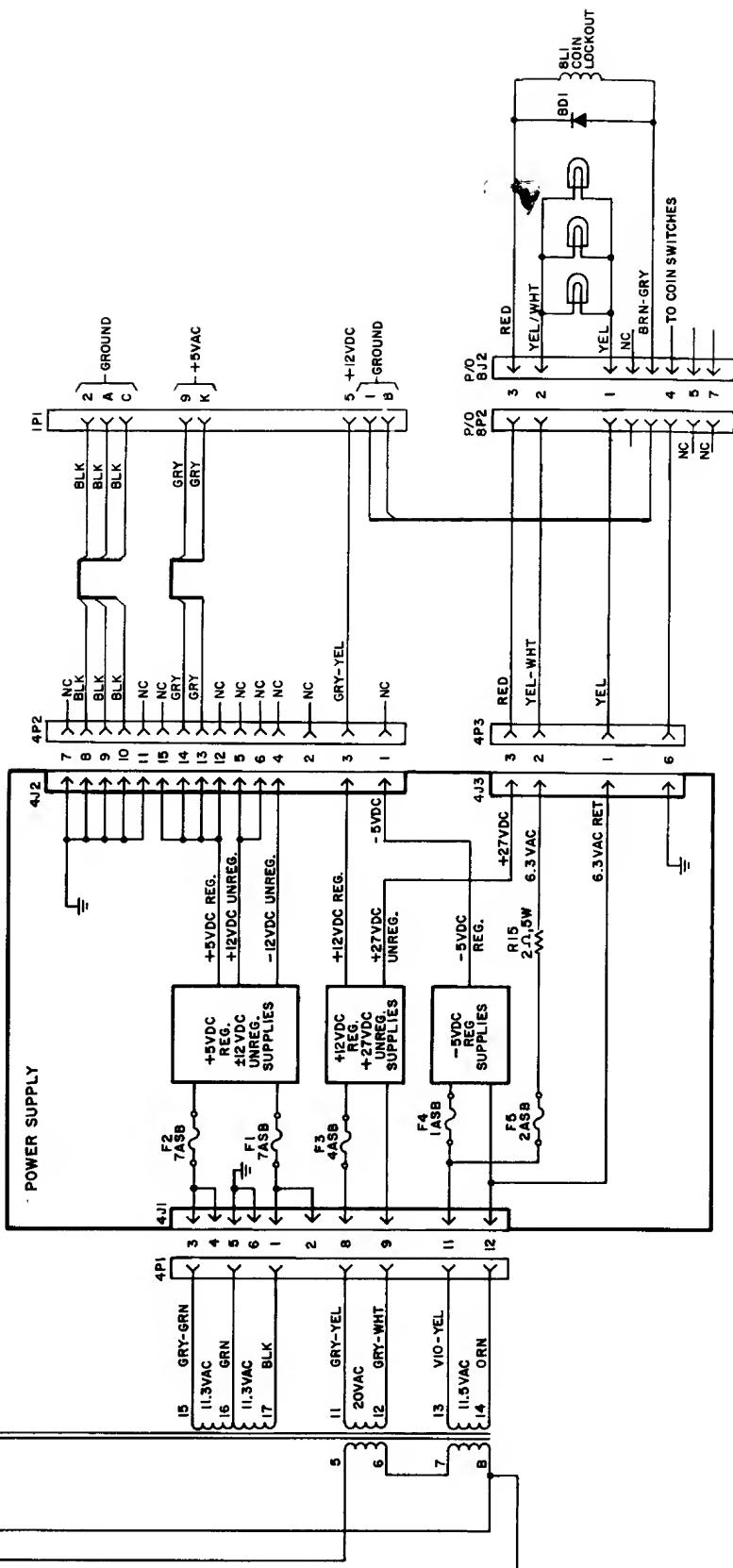
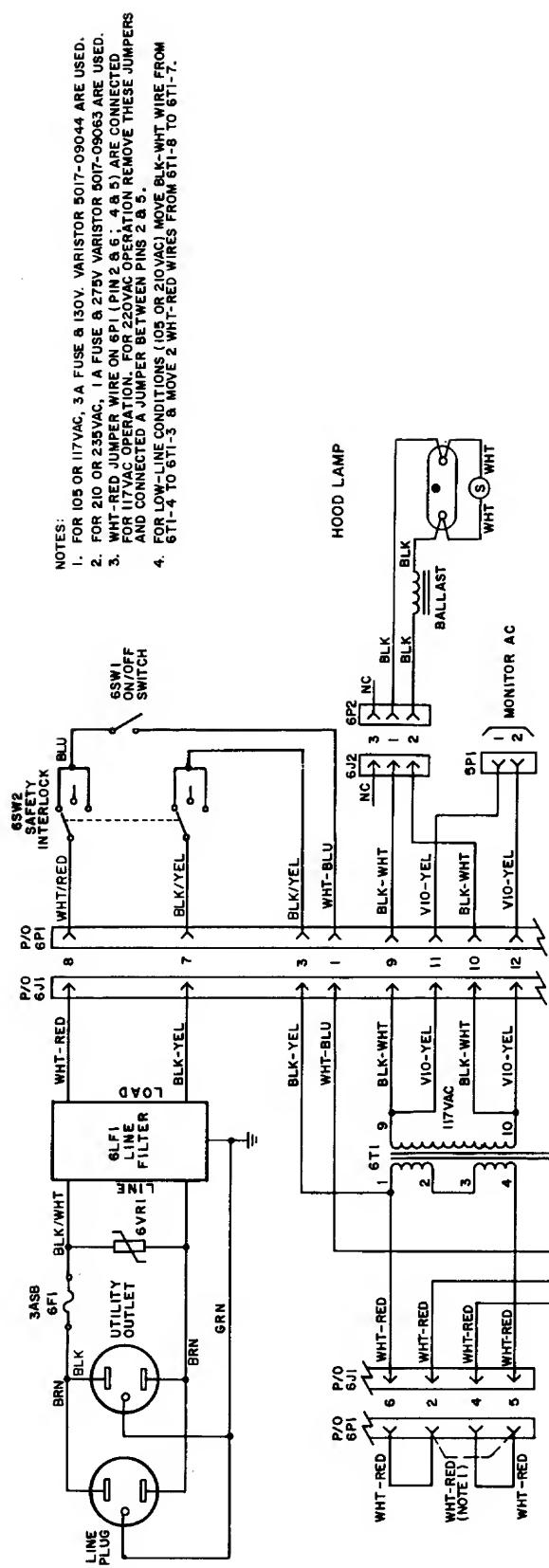
5850-08728-00 U.S. DOM.

5850-08737-00 AUS.

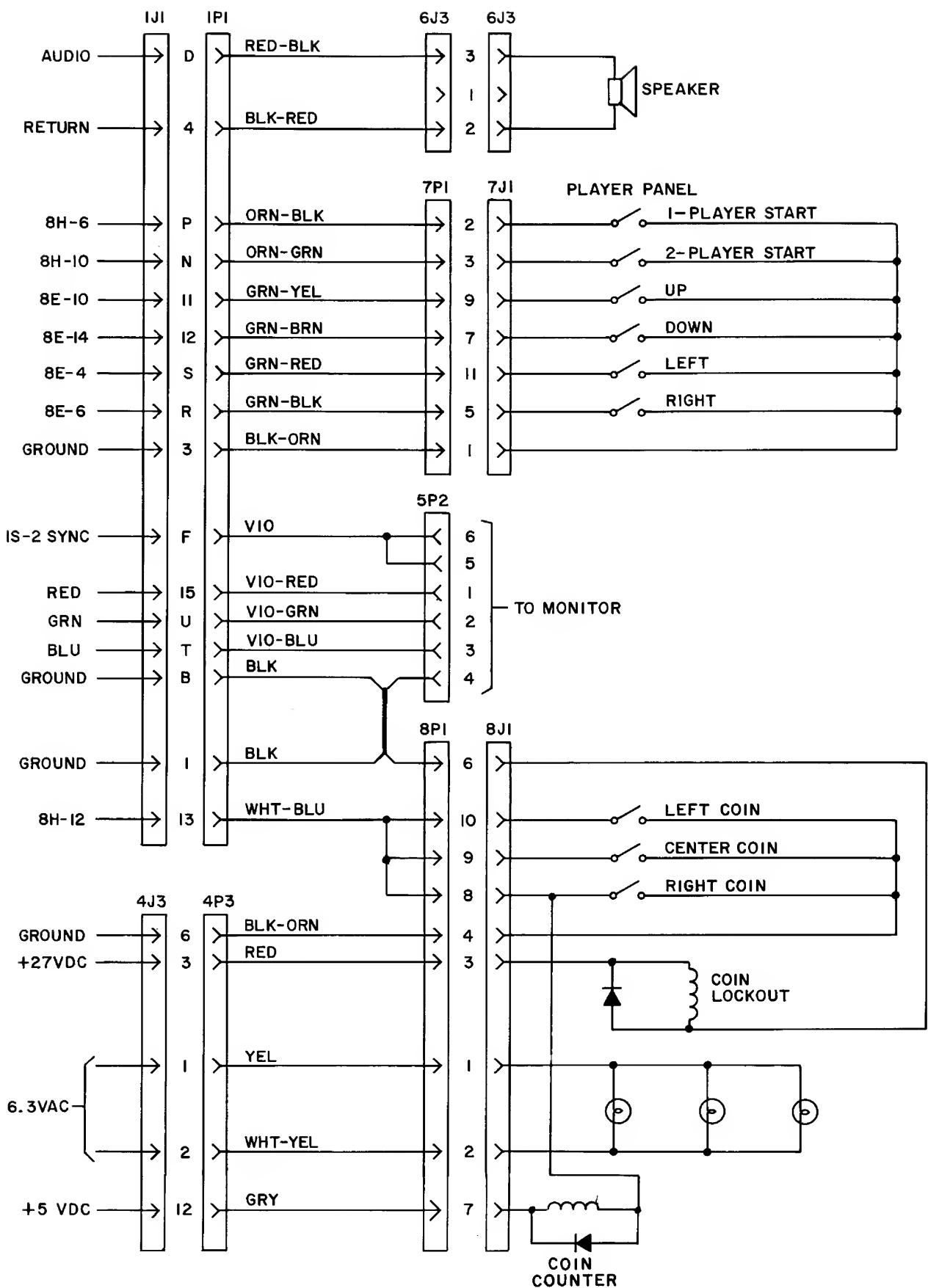
5850-08743-00 U.S.L.A.

5850-09126-00 12 FT. FRANCE

5850-09131-00 AWG 18-12 JAPAN



### Power Wiring Diagram



Cabinet Wiring Diagram